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TRANSMITTAL OF APPEAL BRIEF	Docket No. 80250(302741)

In re Application of: Hiroyuki Tsuda

Application No.	Filing Date	Examiner	Group Art Unit
10/573,888-Conf. #9923	November 13, 2006	H. Q. Lam	2883

Invention: OPTICAL FUNCTIONAL WAVEGUIDE, OPTICAL MODULATOR, ARRAYED WAVEGUIDE GRATING, AND DISPERSION COMPENSATION CIRCUIT

TO THE COMMISSIONER OF PATENTS:

Transmitted herewith is the Appeal Brief in this application, with respect to the Notice of Appeal filed: September 3, 2008 .

The fee for filing this Appeal Brief is $ 540.00 .

[x] Large Entity [ ] Small Entity

[ ] A petition for extension of time is also enclosed.

The fee for the extension of time is ________ .

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This sheet is submitted in duplicate.

Willy Brooks

Dated: November 3, 2008

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Docket No.: 80250(302741)
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Hiroyuki Tsuda

Application No.: 10/573,888

Confirmation No.: 9923

Filed: November 13, 2006

Art Unit: 2883

For: OPTICAL FUNCTIONAL WAVEGUIDE, OPTICAL MODULATOR, ARRAYED WAVEGUIDE GRATING, AND DISPERSION COMPENSATION CIRCUIT

Examiner: H. Q. Lam

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed in this case on September 3, 2008, and is in furtherance of said Notice of Appeal.

The fees required under § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.2:

I. Real Party In Interest
II Related Appeals and Interferences
III. Status of Claims
IV. Status of Amendments
V. Summary of Claimed Subject Matter
VI. Grounds of Rejection to be Reviewed on Appeal
VII. Argument

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

KEIO University

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

Claims 1-10 were originally filed in this application, and claim 11 was added during prosecution.

B. Current Status of Claims

1. Claims canceled: 2, 8, 10
2. Claims pending: 1, 3, 4, 5, 6, 7, 9, 11
3. Claims rejected: 1, 3, 4, 5, 6, 7, 9, 11

C. Claims On Appeal

The claims on appeal are claims 1, 3, 4, 5, 6, 7, 9, 11

IV. STATUS OF AMENDMENTS

Applicant filed an Amendment After Final Rejection on June 13, 2008, canceling claims 2 and 10 and amending claims 1, 5-7, 9 and 11. The Examiner responded to the Amendment After Final Rejection in an Advisory Action mailed September 3, 2008. In that Advisory Action, which replaced the Advisory Action mailed

July 9, 2008, the Examiner indicated that Applicants' proposed amendments to claims 1, 5, 6, 7, 9, 11 would be entered.

Accordingly, the claims enclosed herein in Appendix A do incorporate the proposed amendments to claims 1, 5, 6, 7, 9, and 11, as indicated in the paper filed on June 13, 2008, which has been entered by the Examiner.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is directed to an optical functional waveguide, an optical modulator, an arrayed waveguide grating and a dispersion compensation circuit having a small size, used with saved energy and capable of controlling the phase of light at high speed and of adjusting the optical path length or wavefront.

With reference to claims 1, 5, 6, 7, and 9 on appeal, the optical functional waveguide of the present embodiment includes: substrate 11; quartz waveguide clad 12; quartz waveguide core 13; heater electrode 16; groove structures 31; a filling material 32; and a quartz slab waveguide 33 constituted by the quartz waveguide clad 12 and the quartz waveguide core 13. The optical functional waveguide is not a single mode waveguide and serves as a phase modulation portion for optical modulators. The temperature of the substrate 11 is controlled and the refractive index of the filling material 32 is controlled. Each refractive index of the quartz waveguide clad 12 and the quartz waveguide core 13 varies, but the variation is so small compared to that of the filling material 32 that it can be disregarded. When the effective refractive index of the quartz slab waveguide 33 and the refractive index of the filling material 32 are the same at a certain temperature, light propagating through the quartz slab waveguide 33 is hardly affected. However, the refractive index of the filling material 32 relatively increases or decreases as the temperature rises or lowers, and thus the propagating light is subjected to convex lens operation or concave lens operation. As a matter of course, when the refractive index temperature coefficient of the filling material 32 is negative, the propagating light is subjected to concave lens operation or convex lens operation respectively. Further, the focal length of the lens can be controlled by the temperature. Thus, a wavefront of the light propagating through the slab waveguide

can be controlled by control of the temperature of the filling material. That is, a divergence angle of the propagating light can be controlled. FIG. 8B specifically shows a convex lens shape for filling material 32, FIG. 9B specifically shows a concave lens shape for filling material 42. As a matter of course, a plano-convex lens type, plano-concave lens type, a meniscus lens type or the like, furthermore a spherical lens type or aspherical lens of these is applicable and also a lens type combining a spherical surface with an aspherical surface is applicable in some cases. Alternatively, as a matter of course, any of these lens types may be combined with each other. (Specification paragraphs [0030, 0031, 0032]; FIGS. 8A-8B, 9A-9B.)

The heater electrode 16 is interposed between the grooved structure 14 provided along the optical path so that the temperature of the filling material 15 can be quickly and sharply varied with small energy. (Specification, paragraph [0023]; FIGS. 1A-1B.)

With specific reference to only claim 11 on appeal, the optical functional waveguide includes: heater electrode 16; a single mode input waveguide 101; a tapered waveguide 102; a slab waveguide 103; a first single mode output waveguide 104a; a second single mode output waveguide 104b; wedge-shaped, that is, trapezoidal groove structures 105; and a filling material 106. The wedge-shaped groove structures 105 are arranged so that directions of wedge are the same. That is, a 1×2 optical switch is provided. A guide direction of light is varied by temperature control of the filling material 106, and thus the optical switch is realized. The temperature control allows light made incident into the single mode input waveguide 101 to selectively output from the first single mode output waveguide 104a and the second single mode output waveguide 104b. (Specification, paragraph [0038]; FIG. 15.)

The heater electrode means recited in claim 11 on appeal is represented by heater electrode 16 shown in FIG. 15, and provides the heating function described in paragraph [0023] of the specification

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether or not claims 1, 3-5, 9, and 11 on appeal are patentable over the combination of U.S. Patent Publication 2004/0126052 to Kamei et al. (hereafter "**Kamei et al.**"); U.S. Patent 5,438,637 to Nilsson et al. (hereafter "**Nilsson et al.**"); and U.S. Patent 6,373,872 to Deacon (hereafter "**Deacon**"), under 35 U.S.C. §103(a).

2. Whether or not claims 6-7 on appeal are patentable over the combination of **Kamei et al.**, **Nilsson et al.**, **Deacon** and U.S. patent 6,122,419 to Kurokawa et al. (hereafter "**Kurokawa et al.**"), under 35 U.S.C. §103(a).

VII. ARGUMENT

1. Claims 1, 3-5, 9, and 11, as a group, are patentable under 35 U.S.C. §103(a) over the combination of **Kamei et al.**, **Nilsson et al.**, and **Deacon**.

Kamei et al. discloses an optical waveguide circuit including a first loss component for causing a diffraction loss of light propagating through an optical waveguide, and a second loss component provided at least one of before and after the first loss component, for causing a diffraction loss less than the diffraction loss in the first loss component to the light propagating through the optical waveguide.

Paragraphs [0189] and [0192] disclose that grooves 44a-44d are filled with temperature compensation materials having a refractive index temperature coefficient different in sign for the temperature coefficient of the effective refractive index of the optical waveguide 43.

Deacon discloses a channel-switched turnable laser in which waveguides 122, 124 are heated by "serpentine" heater traces 160, 162, as shown in FIG. 1.

Nilsson et al. discloses an electrically controllable filter device which comprises an electrode structure which induces a filter for waves within a given

wavelength range. The electrode structure is so formed that, within the given wavelength range, it acts as a filter merely upon electrical feeding, whereas, in the absence of electrical feeding, it has no filtering effect. Furthermore, the electrode structure is so arranged that the filter depending on how the electrode structure is fed can be tuned to a number of different discrete frequencies.

FIG. 40 and paragraph 0291 of **Kamei et al.** disclose "temperature compensation materials 419a-419n that fill a plurality of grooves 418a-418n." Thus, the optical characteristics can be maintained even through the room temperature changes.

In contrast, claim 1 on appeal recites "a plurality of lens-shaped groove structures ...are filled with a material having a refracture index temperature coefficient different from that of said core" and "a heater electrode... for controlling temperature of said material." Page 16, line 23 to page 17, line 3 of the specification discloses that "a wavefront of the light propagating through the slab waveguide can be controlled by control of the temperature of the filling material. That is, a divergence angle of the propagating light can be controlled." Claim 1 on appeal provides this feature, which is not disclosed in any of the cited references.

Similarly, claim 11 on appeal recites "a plurality of wedge-shaped groove structures... being filled with a material having a refractive index temperature coefficient different from that of said core." Page 23, lines 12-14 of the specification disclose that a "guide direction of light is varied by temperature control of the filling material." Claim 11 on appeal provides this feature, which is not disclosed in any of the cited references.

2. Claims 6-7, as a group, are patentable over the combination of **Kamei et al.**; **Nilsson et al.**, **Deacon**, and **Kurokawa et al.**, under 35 U.S.C> §103(a).

Kurokawa et al. has been cited for teaching the dispersion compensation circuit comprising the optical functional waveguide according to claim 6 on appeal but, like the other cited references, fails to teach, mention or suggest the plurality of lens-shaped groove structures recited in claim 1 on appeal, from which claims 6 and 7 depend.

In view of the arguments presented above, Appellant respectfully requests reversal of the 35 U.S.C. §103(a) rejections of claims 1, 3-7, 9, and 11 on appeal

VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A include the amendments filed by Applicant on June 13, 2008.

Dated: **November 3, 2008**

Respectfully submitted,

By ______________________

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APPENDIX A

Claims Involved in the Appeal of Application Serial No. 10/573,888

Claim 1 An optical functional waveguide comprising:

a substrate;

a clad formed on said substrate;

a core which is formed in said clad and serves as an optical path;

a plurality of lens-shaped groove structures formed so as to align at a predetermined interval along the optical path and fragmentize the optical path and being filled with a material having a refractive index temperature coefficient different from that of said core; and

a heater electrode interposed between said plurality of groove structures provided along the optical path for controlling temperature of said material.

Claim 2 (Canceled)

Claim 3 An optical functional waveguide according to claim 1, wherein at least one of the end faces of said plurality of groove structures is tilted from a position perpendicular to the optical path.

Claim 4 An optical modulator comprising the optical functional waveguide according to claim 1 and modulating amplitude or phase of light.

Claim 5 An arrayed waveguide grating comprising the optical functional waveguide according to claim 1 in a slab waveguide.

Claim 6 A dispersion compensation circuit comprising the optical functional waveguide according to claim 1 in the vicinity of a coupling portion that two arrayed waveguide gratings are coupled to each other in a cascade.

Claim 7 A dispersion compensation circuit comprising:

a mirror provided in a waveguide and arranged in the vicinity of a spectrum plane; and

the optical functional waveguide according to claim 1 arranged in the vicinity of said mirror.

Claim 8 (Canceled)

Claim 9 An optical functional waveguide according to claim 1, wherein said groove structure is provided at a slab waveguide side of a coupling portion of the slab waveguide and a single mode waveguide.

Claim 10 (Canceled)

Claim 11 An optical functional waveguide comprising:

a substrate;

a clad formed on said substrate;

a core which is formed in said clad and serves as an optical path;

a plurality of wedge-shaped groove structures formed so as to align at a predetermined interval along the optical path and fragmentize the optical path and being filled with a material having a refractive index temperature coefficient different from that of said core; and

a heater electrode means interposed between said plurality of groove structures provided along the optical path for controlling temperature of said material.

APPENDIX B

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

APPENDIX C

No related proceedings are referenced in II. above, hence copies of decisions in related proceedings are not provided.